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The Fern Collections in Some European Herbaria, VI

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HAMBURG

The herbarium and botanical garden of the Staatsinstitut für Allgemeine Botanik in Hamburg are not well known or often visited by taxonomists, in spite of the herbarium being one of the larger of the world herbaria and one of great importance for certain areas. There were private gardens in Hamburg from early times. The Hamburg Academic Gymnasium was founded in 1613, and many of its early professors were interested in botany, especially Joachim Jungius (1587-1657), who was appointed rector in 1629. Sachs, in his history of botany, states that Jungius was the first in Germany, as Caesalpinus was in Italy, to combine philosophical thoughts on botany with the true observation of living plants. It seems clear that Linnaeus studied the works of Jungius in his youth. Linnaeus visited Hamburg in his travels and commented on the richness of the gardens there, which included even then 50 species of the South African genus *Mesembryanthemum* and 45 species of *Aloe*.

The credit for the first large private garden must go to J. N. Buek, who was referred to as "the German Philip Miller," in reference to the noted English gardener of the same period. Buek's catalogue of 1779 had 200 pages of plants for sale.

Johannes Fluegge (1775-1816) was a talented Hamburg botanist. He got his doctorate in Erlangen in 1800 under Schreber, but even prior to this he had made many collecting trips in Germany with

his friend Floercke (himself later professor of botany in Rostock and a noted bryologist of his time). He took the opportunity of making friends with all the botanists of his day—Martius, von Moll, Jacquin, Schrader, Hedwig, Schkuhr. Later he travelled in France and Italy, collecting, studying, and making the acquaintance of Richard, Gouan, Gilibert, Jussieu, Desfontaines, Allioni, Bellardi, and others. He thought to work on a flora of France, but abandoned the idea when he found DeCandolle engaged on the same project. During these years he exchanged thousands of plants with botanists in Germany, France, and England.

Fluegge returned to Hamburg in 1810 and decided to start a true public botanical garden. He sold about a hundred shares at 400 Marks Banco (600 RM) and was able to buy Buek's establishment, which at the time included about 1200 species. Willdenow sent plants from Berlin, Sprengel from Halle, Hornemann from Copenhagen, Thouin from Paris, Fischer from Gorenki, Balbis from Turin, and Bernhardi from Erfurt, and soon there were 3000 species in the garden, including many rare plants from Africa and Australia. Unfortunately, the army of Napoleon passed through Hamburg in 1813, leveling much of the city, including Fluegge's garden, which was completely destroyed, including the herbarium and manuscripts. Fluegge never recovered from this shock and died shortly thereafter of a "nervous fever." He is remembered today only from his "Graminum Monographiae", only one part of which was published (mostly on *Paspalum*), and the duplicate plants that he exchanged.

Hamburg citizens, having had a botanical garden for a few years, were not content without one, and so another was authorized. Johann Georg Christian Lehmann had been appointed Professor of Botany in 1818, a post that had been vacant since Prof. Reimarus had fled Hamburg during the siege. Lehmann brought with him from Goettingen about 2000 species of plants for his private garden. When a site for the new public botanical garden was found near the Dammthor, these plants were moved to the new garden. Lehmann himself planted the first tree November 6, 1821. He brought the Swiss Ohlendorff from Bern as chief

gardener. The quaint, straw-thatched cottage erected for Ohlen-dorff was still standing and in use in 1900.

Lehmann started the garden with a flurry of activity. Only two years later, in 1823, he sent out seeds of 5264 species and received 3609 packets of seeds and 2892 living plants. A coldhouse was built by public subscription in 1822. Lehmann continued his arduous duties for almost 40 years, not only as head of the garden but as the only professor of botany, and in addition at first he was obliged to teach zoology also. The number of species in the garden increased to 18,000 by 1848, and included many rare plants such as *Dryandra*, *Epacris*, *Borreria*, *Wallichia*, *Nepenthes*, and *Dionaea*. Lehmann found time to continue his researches on his favorite genus *Potentilla*, and also to publish ten parts of his "Pugilli," a series of papers describing interesting and new plants of the garden and herbarium. The later numbers of this were devoted almost wholly to Hepaticae.

After Lehmann's death in 1860, Heinrich Gustav Reichenbach (1824-1889) was appointed Director. He was the son of the famous botanist Heinrich Gottlieb Reichenbach, Professor of Botany in Dresden. The son was interested in orchids from the first, and contributed the account of the Orchidaceae to his father's "Icones Florae Germanicae et Helvetiae," on which he worked for ten years, with publication in 1851. He received his doctorate the next year by his thesis "De pollinis Orchidearum genesis ac structura," which brought about his appointment as lecturer in the University of Leipzig, where he was made Extraordinary Professor three years later. He won the position in Hamburg over five competitors.

On coming to Hamburg he made some fundamental changes, suspending the sale of plants to the public, eliminating the tree nursery and kitchen gardens, and starting a botanical museum. The plants in the garden had been arranged by the Linnaean system but he rearranged them by that of Endlicher, a much more meaningful arrangement. He began building up the collection again, purchasing the entire collection of the famous English gardener Saunders, of Reigate, Surrey.

Reichenbach continued his orchid studies, becoming the most famous—and indeed almost the only—orchidologist of his time after the death of Lindley. He published literally hundreds of papers in widely scattered journals, which included hundreds of new species. His name is usually abbreviated to “Rchb. f.” by orchidologists, but this abbreviation is not in accordance with the rules as set forth in the Code. In this connection he travelled widely to various herbaria, often remaining for weeks or months. He was especially fond of Kew and planned on settling there after his retirement. He is reported by contemporaries to have been jealous of others working on orchids, which he considered a private preserve. In an obituary (Proc. Linn. Soc. Lond., August 1891) a colleague wrote: “A careful working of it [Reichenbach’s herbarium] will be needed to clear up the many puzzles in his descriptions, which of late years had assumed an esoteric character. . . . The state of his herbarium is quite unknown, for during long years past no botanist has been permitted to have even a glimpse of the collection. . . . At his last visit to this country [England] Reichenbach was looking forward to his retirement . . . and the preparation of a projected Index Reichenbachianus, which was to give a much-needed guide to the widely scattered descriptions of species and varieties, but this last, if ever begun, is unfinished. At the Ghent Exhibition of 1888 it was noticed he was looking unwell and had shrunk from his accustomed portliness. By his death a gap is made which no man is likely to fill.”

Reichenbach was an outgoing person, and his conversation was enlivened by witticisms and sarcastic remarks that were amusing to those who were merely onlookers and were not exposed to the brunt of his attacks. His sense of humor even carried over into his publications. He reported gleefully one story in the “Gardener’s Chronicle:” It seems that a German entomologist described a butterfly under the name *Sesia longiformis*. Reichenbach wrote him that the name “*longiformis*” was improper (because “*formis*” means “having the shape or form of”, as in “*loriformis*,” having the shape of a strap, but “*longiformis*,” having the shape of a “long” would be impossible). The entomologist dutifully renamed

his butterfly after the collector "*schmidtiformis*"! But Reichenbach had his detractors as well as admirers, and Hewitt Watson is said to have remarked that if Reichenbach's herbarium ever came into his control he would make a funeral pyre of it.

Reichenbach's chief claim to notoriety was his will, which even obtained notices in the newspapers, ordinarily unconcerned about the disposition of herbaria. In the London Evening Standard of June 5, 1889, appeared the following: "Professor Reichenbach's will is an event and a most disastrous one. It is indeed a scandal. That renowned herbarium which gave to Hamburg, in the eyes of botanists, somewhat of the sanctity that moslems attach to the city where the Kaaba stands, is not only diverted from the use and destination which savants all over the world expected, more than that it is withdrawn from the service of mankind for twenty-five years. We do not know that Professor Reichenbach was a naturalized Englishman, but his labours and his fame were associated with this country. It was taken for granted by men of science everywhere that the herbarium would go to Kew, and there is reason to think that he contemplated the bequest until very recent years. But neither Kew nor England is mentioned in the will. . . . Of course there is a story connected with this most unfortunate disposition—a story which is being discussed by all of the botanists of the world; but we would not dwell on it here. It is enough to say that the power of malicious individuals to damage the interests of the State is displayed in a striking manner."

The will in question left his herbarium to Vienna on the condition that it remained unopened and sealed for 25 years from his death; if Vienna would not accept it under these conditions, it was to be offered in turn to Uppsala, the Gray Herbarium, and Paris.

I do not know his reason for turning away from Kew. I asked Dr. John Hutchinson, who is the oldest working member of the Kew staff although of course not actively working in Reichenbach's time, but he did not know, other than to think that Reichenbach resented Rolfe having started to work on orchids at Kew. But I can guess at the reason for the peculiar provision in his will that the herbarium be sealed for 25 years. This coupled with the fact

that he would allow no visitors to see his herbarium shows clearly that it was filled with fragments from various herbaria, those jokingly called "kleptotypes." By having the herbarium used it would be soon obvious that fragments came from Kew and other herbaria. After a lapse of 25 years most of the persons in charge of herbaria would be dead or retired and in no position to state whether the fragments had been removed by permission or not. That this guess is true is shown by the contents of the herbarium when it was opened, although perhaps no one has ever commented on the fact. The herbarium was found to be tremendous, numbering more than 60,000 sheets of orchids and 8000 drawings. Almost all collectors of orchids are represented, including many from the late eighteenth century and early nineteenth, such as Pavon, Commerson, Humboldt and Bonpland, Chamisso, Blume, Bory, Haenke, Labillardière, Martius, Reinwardt, and Gaudichaud.¹ These specimens could hardly have come as duplicates to Reichenbach in such quantities and must have been removed from herbarium sheets, either with or without permission. This case is by no means unique. Christensen's fern herbarium purchased by the British Museum contains hundreds of fragments removed from various herbaria. The Underwood Herbarium, now in the New York Botanical Garden, contains hundreds of such "kleptotypes" also. The strangest case is that of Baillon, who worked at Paris for many years although not as a staff member. On his death his "type herbarium" went to Paris, where it is still maintained as a separate herbarium. It consists entirely of fragments removed from sheets in the Paris Herbarium, which is curious since the sheets in the Paris herbarium were freely available to him. These fragments really ought not to be considered the types of Baillon's new species but rather the full sheets from which they were removed. Baillon copied off the label data, and so the fragments can, at least usually, be matched up with the full sheets from which they were taken.

¹ "Verzeichnis der im Orchideenherbare von Reichenbach fil. enthaltenen Sammlungen" by K. von Keissler and R. Rechinger. *Ann. Naturhist. Hofmus. Wien* 30: 13-23. 1916.

Several years after Reichenbach's death Dr. Zacharias (born 1852 in Hamburg) became Director for many years. In 1901 all the botanical institutions were united to form the Botanische Staatsinstitut. In 1912 a separation was made into the Staatsinstitut für Angewandte Botanik, with Dr. A. Voigt named Director, and the Staatsinstitut für Allgemeine Botanik, which included the Botanical Garden and the Herbarium Hamburgense. Dr. Hans Winkler became the first Director of the Staatsinstitut für Allgemeine Botanik. He was a student of Wilhelm Pfeffer, under whom he received his Ph.D. in 1898, working on physiology. He was instrumental in setting up the University of Hamburg in 1919. His own research was on hybridization and parthenogenesis, and on apogamy and alternation of generations in ferns. He made collecting trips to the East Indies in 1903-4 and 1924-5. His extensive Bornean collections were still partly unworked in 1954 and probably still are; they have many undistributed duplicates also, I was told by Dr. Domke. Winkler retired during the War in 1943, when Hamburg was under constant attack. About sixty percent of the plants in the garden were destroyed by the bombing, but fortunately the herbarium escaped injury. Winkler died of a heart attack in 1945. In the same year Prof. Walter Mevius, a physiologist, was named Director. He was succeeded in 1964 by Prof. Horst Drawert, a cytologist and physiologist.

Dr. Edgar Irmscher, a specialist on *Begonia*, was named Curator of the Herbarium Hamburgense in 1912; he served in that post until 1945. Dr. Walter Domke succeeded Irmscher. Since 1961 Dr. Kurt Walther has been Curator. Other staff members of the herbarium of international reputation have been H. Hallier, who worked on Convolvulaceae, and C. Grimme, who worked chiefly on economic plants.

THE HERBARIUM

In the early years of the botanical garden there was no official herbarium. The Director, Lehmann, put all the specimens received in his personal herbarium, a practice common enough at one time but one to be deplored. Specimens that come to botanists

officially connected with an institution ought to be considered institutional property, and so they are today usually. But Lehmann's herbarium was divided up into 150 different lots, which were individually sold and dispersed. We do not know today what it contained or where it went, and we are even more ignorant about it than about the herbaria of Kurt Sprengel or of Lambert, which were similarly broken up. It is perhaps not an easy matter to locate Lehmann's types today.

The beginning of the permanent herbarium was the gift of the private herbarium of H. W. Buek, of Hamburg, in 1864, which contained about 10,000 specimens. About the same time the algal herbarium of Nikolaus Binder was also donated. This is a large and important collection containing types or isotypes collected or described by Mertens, Tilesius, Agardh, Lyngbye, Raben, Hering, Montagne, Lindenberg, Rudolphi, Weber and Mohr, and many others. A little later the herbarium of the private Museum Godeffroy, built up by the Godeffroy family, was acquired. This contained the original collections of Graeffe, Amalie Dietrich, Kleinschmidt, and others who had been sent on expeditions by Godeffroy. The Graeffe collections are important for fern students, being the basis for Luerssen's "*Filices Graeffeanae*."

The Buek and Binder herbaria were united in 1879, which is considered the official start of the present herbarium. Richard Sadebeck took over as custodiam in 1882, and A. Voigt became his assistant. The herbarium grew rapidly until at the last estimation it contained 700,000 specimens. Sadebeck brought his own herbarium, mostly of European plants but containing also some exotics, such as Chilean specimens from Philippi. The grass herbarium of Klatt was acquired, and Willkomm's algal herbarium. But the largest accessions were of plants from Africa. The oldest of these and perhaps the most important were the South African collections of the Drège brothers Jean and Carl, who were born near Hamburg and who went to the Cape in 1826. They collected extensively, travelling by ox-cart to the mouth of the Orange River in the west and to Port Natal (Durban) in the east, finding more than 7000 species, about two-thirds of

all those that had been previously known in South Africa. The principal collections were in Berlin and were destroyed in World War II; there are only a few in Hamburg. Later Jean Drège was joined by Christian Friedrich Ecklon and Karl Zeyher, and the three of them continued to make extensive collections which were brought back to Hamburg to be studied in the nursery that the Drège family owned in Hamburg. Drège published a "Catalogus plantarum exsiccatarum Africae australioris" in Hamburg (1837-40), and Ecklon and Zeyher a more extensive scientific paper, "Enumeratio plantarum Africae australis extra tropicae," in three parts (1834-37). Many of the Ecklon and Zeyher plants were worked up by Otto Wilhelm Sonder. Sonder (born in Holstein in 1812) worked as a pharmacist for a living, but apparently all his spare time was spent on botany. He achieved an international reputation by his papers on *Salix*, on the algae of Australia collected by Preiss, and especially on the South African plants of Drège, Ecklon, and Zeyher, on which he worked with his friend Prof. William H. Harvey, of Dublin. The two were both interested in algae and proved congenial workers. Together they produced the fine three volumes of the "Flora Capensis," published in 1859-1865. The work was left incomplete by the death of Harvey, but it is still a classic work on the South African flora. Sonder's personal herbarium, the algae at least, was sold and is now partly in Stockholm and partly in the National Herbarium of Victoria, Melbourne.

The more recent African collections constitute perhaps the most important part of the herbarium. They include the original set of Kurt Dinter's plants from Southwest Africa, the Max Julius Dinklage specimens from western Africa, especially Liberia and Gabon, the Mildbraed collections from Cameroons (the 3500 numbers of which are most important since the destruction of the first set in Berlin), plus collections by Fischer from Zanzibar, Stuhlmann from Mozambique (but not Tanganyika), Lindinger from the Canary Islands, and many others. A full account of the African collections has been published by Kurt Walther in his paper "Afrikanische Pflanzen in Hamburg, Hamburger Botaniker

in Afrika" (Mitt. Geogr. Gesell. Hamburg 56: 87-103. 1965). The collections in the general herbarium are far too numerous to begin to enumerate them.

PUBLICATIONS

The early works of the staff at Hamburg were partly published in the "Jahrbuch der Hamburgischen Wissenschaftlichen Anstalten," between 1889 and 1913, which was not however restricted to botany. The present serial publication is the "Mitteilungen aus dem Institut für Allgemeine Botanik in Hamburg," volume 1 of which appeared in 1914. The most important volumes in a taxonomic way are volume 7, which consists of the "Beiträge der Flora von Borneo," a systematic treatment by families of the specimens collected by Winkler, with contributions by Diels, Kränzlin, Brotherus, Pfeffer, Pilger, Merrill, J. J. Smith, Christensen (on the ferns), and Alston (on the Selaginellas). The introduction contains a map of Winkler's itinerary. Volume 10 (1939) is a "Festschrift" for Hans Winkler on his 60th birthday; the principal paper is a "Flora des tropischen Arabien," by O. Schwartz; I am not quite sure whether the material on which this paper is based is preserved in Hamburg or not, but it probably is, in which case Hamburg would be a necessary visit for anyone interested in the Arabian flora. This journal was interrupted by the war and did not resume publication until 1957. Only two volumes have been issued since then.

The "Hamburger Garten und Blumenzeitung" was perhaps not quite an official publication, but it was closely associated with the botanical garden through its editor, Carl Friedrich Eduard Otto (1812-1855), usually called merely Eduard Otto. Otto was the son of the famous gardener of the Berlin Botanical Garden, Christian Friedrich Otto, and so he came by his gifts naturally. He started in as an assistant to his father in Berlin, but after the retirement of Ohlendorff he was chosen to come to Hamburg by Lehmann to be the head gardener, a post that he held for about 40 years. The journal mentioned above was a gardening publication, noticing plants new to cultivation and so forth, very

similar in content to the "Gardener's Chronical" concurrently being published in England. Otto took over as editor with volume 4 (1848) and continued through volume 40 (1884, the year before his death), altogether 37 volumes each with about 575 pages, with a total of over 21,000 pages. Since Otto did all the writing apparently, it is certain that he must have been industrious. The publication, like so many others, did not last long after Otto's death. This journal contains notes on many plants new to cultivation and may contain some new names, although perhaps not intentionally with Latin descriptions. There *are* ferns discussed, but I am sure that no one has ever looked through the volumes to see if any are new, nor is anyone likely to. The journal is by no means easy to read, being in cursive German type (except for the plant names in Roman type), and I have some doubt that many people ever actually read it even when it was being published. There is a portrait of Otto as a frontispiece to volume 41 of this journal, and a biography by F. Goeze (who took over as editor).

FERNS IN HAMBURG

The pride of the fern herbarium according to A. Voigt is the Prantl herbarium purchased after Prantl's death. Karl Prantl was born September 10, 1849, in Munich. He received his doctorate from Munich in 1870 under Naegeli and Radlkofer. With his friend Lorentz, who later went to Argentina to teach and collect, he botanized in Bavaria and the Alps, and then spent a year as Naegeli's assistant. In 1873 he was assistant to Sachs, with whom he worked on the regeneration of the growing point in angiospermous roots. At Sachs' invitation he adapted some of Sachs' works into a "Lehrbuch der Botanik" (1874), which became popular as a text in secondary schools and which went through many editions. In 1879 Prantl turned his attention to ferns, being at this time a professor in Aschaffenburg. His principal work in this field is his "Untersuchungen zur Morphologie der Gefässkryptogamen," I. "Die Hymenophyllaceen" (1875) and II. "Die Schizaeaceen" (1881). Prantl considered the Hymenophyllaceae the lowest group of ferns from a developmental point

of view. Subsequently, he worked on *Cryptogramma*, *Pellaea*, and *Ophioglossum*, and his very last paper in 1892 was on fern classification. From 1889 until his death from tuberculosis in 1893 he was professor in Breslau. Adolf Engler evidently had a high regard for his talents, for he asked Prantl to join him in a vast undertaking, a complete treatment of all the genera of plants, cryptogams as well as vascular plants, something that had hardly been attempted since the time of Linnaeus. The work was to be called "Die Natürlichen Pflanzenfamilien," and Prantl was to be in charge of the cryptogamic portions. Prantl accepted willingly and began work at once, not on the cryptogams but on the early families of angiosperms according to the new system proposed by Engler. Prantl himself had no part in the elaboration of this system, which is now commonly called the Engler and Prantl system. The basic ideas of this arrangement of the families came from Eichler and were modified by Engler in his "Syllabus der Pflanzenfamilien." Prantl worked up the Betulaceae, Fagaceae, Magnoliaceae, Anonaceae, Ranunculaceae, Berberidaceae, Cruciferae, and other families in short order, and it is apparent that had he lived he would have done a major part of the writing himself, something that Engler himself never did. Engler secured the cooperation of many botanists, chiefly German, to complete the work. Although Prantl died shortly after the start of the work, his name remained on the title page throughout.

I have myself never had a high regard for Prantl's work on ferns. His idea of applying morphology and anatomy to taxonomic classification is certainly proper, but he seemed to lack the eye for distinguishing species which is a necessity for a good taxonomist. I, at least, have never found his systematic contributions useful or usable. I am not sure about the size or quality of his fern herbarium. Hamburg has many valuable old fern specimens, and many of these *may* have come from Prantl.

Among the notable collections are those of Graeffe from the South Seas (original), Poeppig (Chile, Peru, and Cuba), Pohl (Brazil, probably including Presl isotypes), Philippi (Chile), Deppe (Mexico, isotypes of Schlechtendal), Daemel (Fiji), Sellow (Brazil,

many isotypes), Wawra, Zollinger (Java, Kunze isotypes), Haenke (Presl isotypes), Sieber (Kaulfuss isotypes), Gueinzius (South Africa, Kunze isotypes), and too many others to mention. One of the important sets is that of Karsten from Colombia and Venezuela. This set is so complete, the sheets so full (sometimes two and three sheets of the same collection), and the labels so complete that I wonder if this is not the original set. It should be compared with the sets in Leningrad and Vienna. Another notable set is from the botanical garden in Berlin of the early cultivated ferns described by Link; so far as I can tell, these match closely the comparable specimens in Berlin, and can be considered as authentic material of Link's species if not actual isotypes.

There has never been in Hamburg a pteridologist of international reputation except Richard Sadebeck, who was professor and custodian of the herbarium in the 1890's and 1900's. Sadebeck had many interests, including ferns. Engler chose him to write the general account of the Pteridophyta for "Die Natürlichen Pflanzenfamilien," and Sadebeck also contributed the accounts of the Hymenophyllaceae, Marsileaceae, and Salviniaceae to this work. Dr. C. Brick, assistant in the herbarium for many years, was also a fern man, and contributed the fern reports in Just's "Botanischer Jahresbericht" from about 1894 to 1910.

I visited the fern herbarium in Hamburg only briefly, for three days in 1954. I was cordially received by Dr. Domke, then the curator and was made to feel welcome. The herbarium was rather crowded at that time, a perennial complaint of almost all herbaria. I did not go to look up anything in particular but merely to get an idea of the scope of the fern collections. I was pleasantly surprised, for the herbarium is indeed rich, and should be visited more often by fern students.

I am much indebted to the present curator, Dr. K. Walther, and to the Chief Custodian, Dr. P. Wiemann, for helpful information. My chief source for the historical part of this account is "Die botanischen Institut der freien and Hansestadt Hamburg," by A. Voigt (1897).

(To be continued)